FIG.1

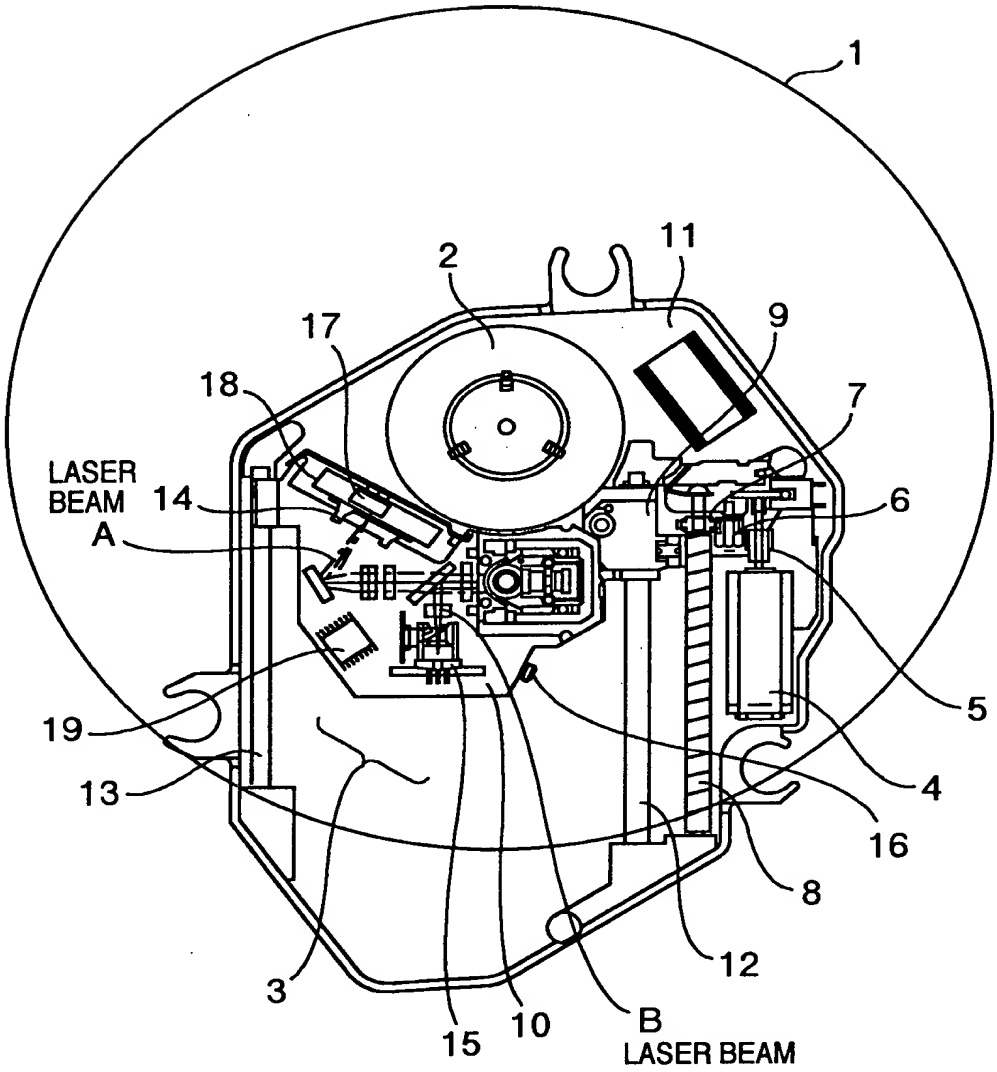


FIG.2

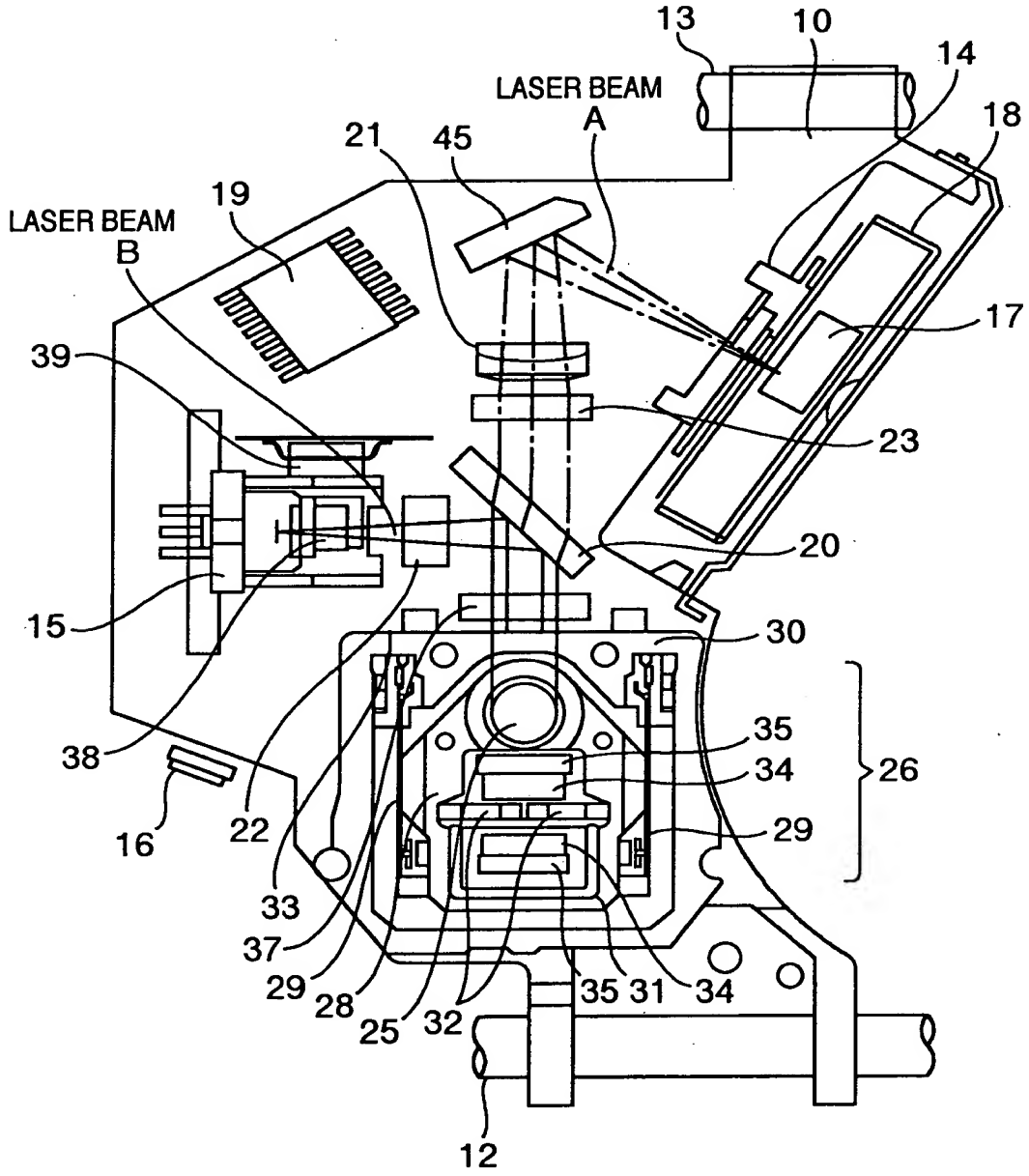

13
10
14
LASER BEAM
A
18
21
45
19
LASER BEAM
B
17
39
23
20
15
30
35
38
34
26
16
22
29
33
37
29
28
25
32
35
31
34
12

FIG.3

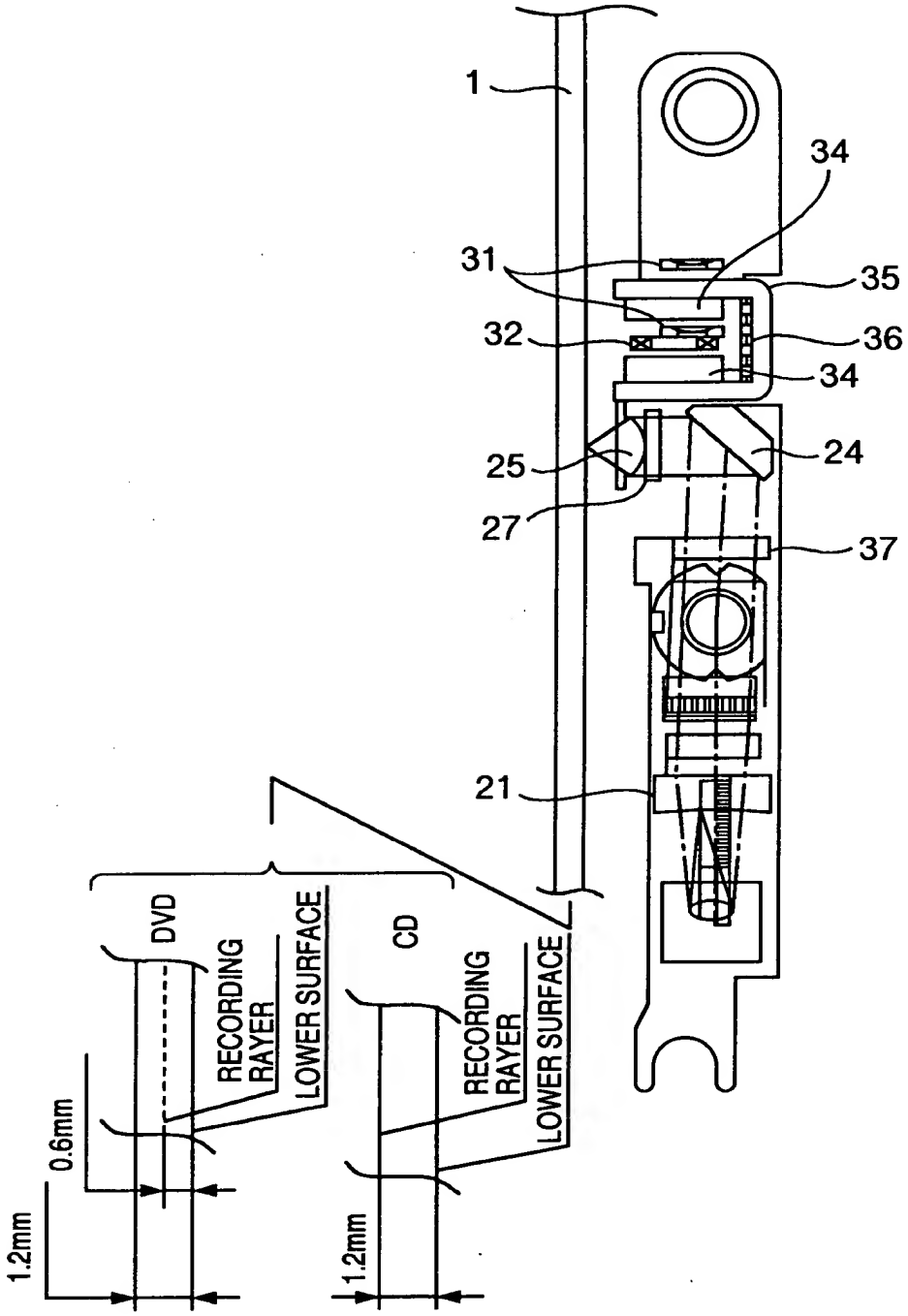

1
34
31
35
32
36
34
25
24
27
37
21
DVD
RECORDING RAYER
LOWER SURFACE
CD
RECORDING RAYER
LOWER SURFACE
0.6mm
1.2mm
1.2mm

FIG.4A

CENTER OF OPTICAL AXIS

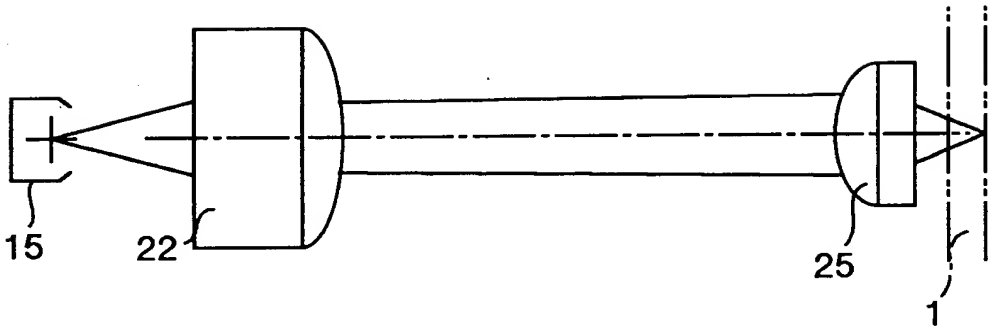


FIG.4B

LENS SHIFT

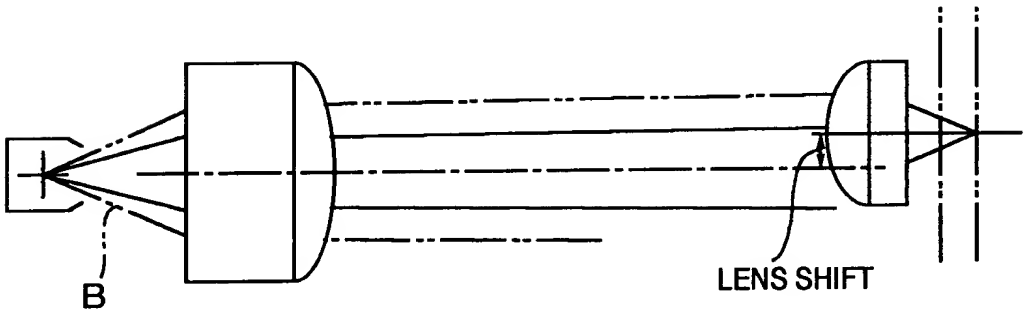


FIG.5A

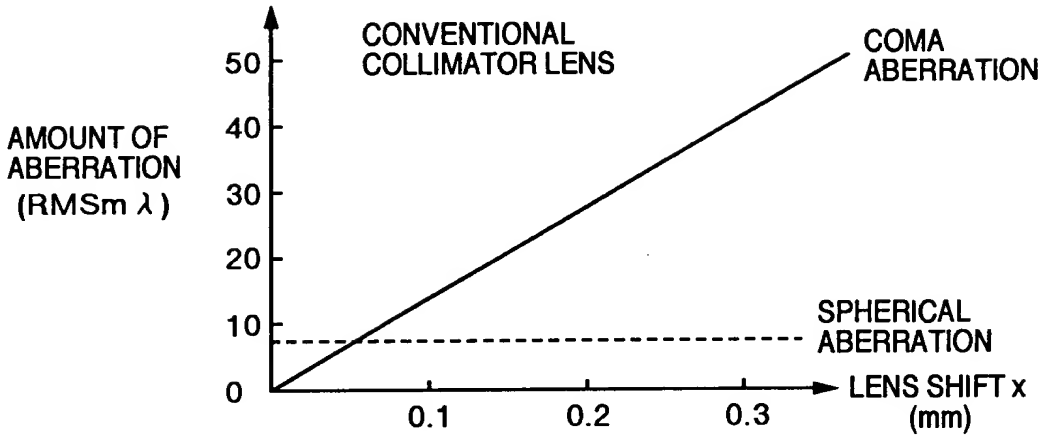
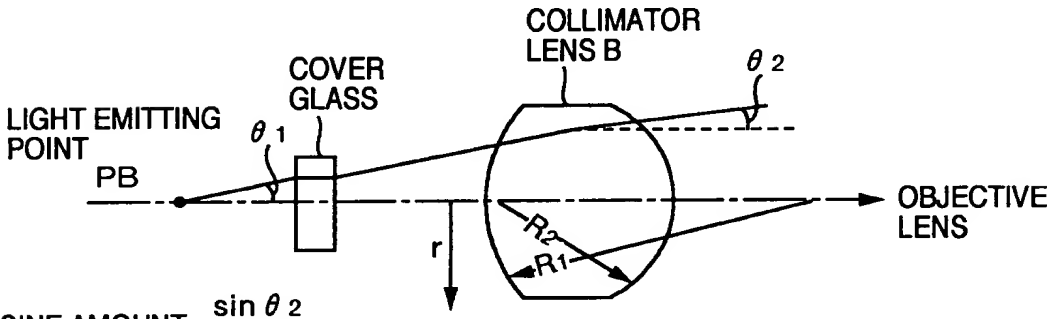


FIG.5B



RATIO OF SINE AMOUNT= $\frac{\sin \theta 2}{\sin \theta 1}$

RATIO OF RADIUS OF CURVATURE=R2/R1

RADIUS r OF COLLIMATOR LENS B

FIG.5C

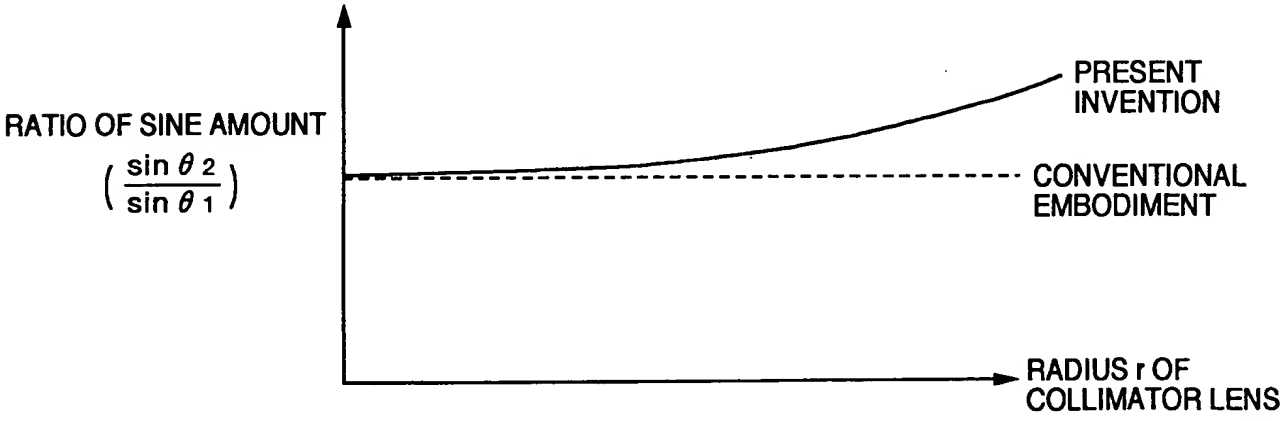


FIG.6A

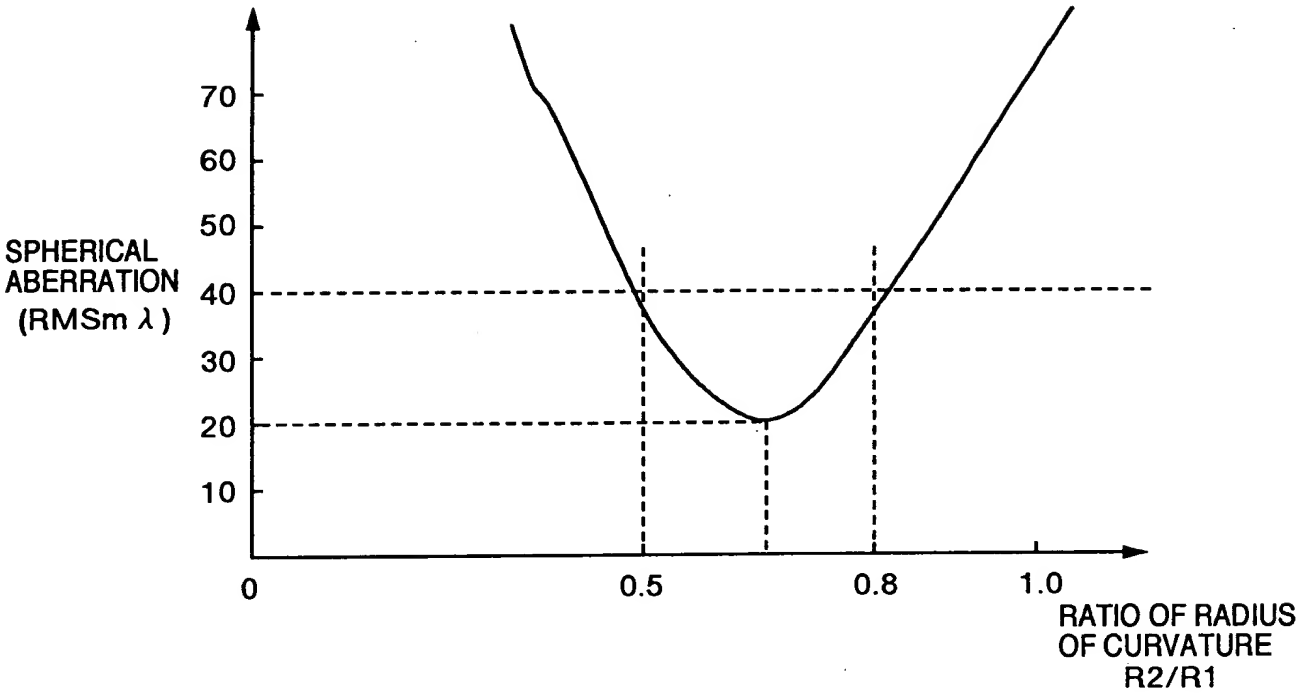

SPHERICAL
ABERRATION
(RMSm λ)
70
60
50
40
30
20
10
0
0.5
0.8
1.0
RATIO OF RADIUS
OF CURVATURE
R2/R1

FIG.6B

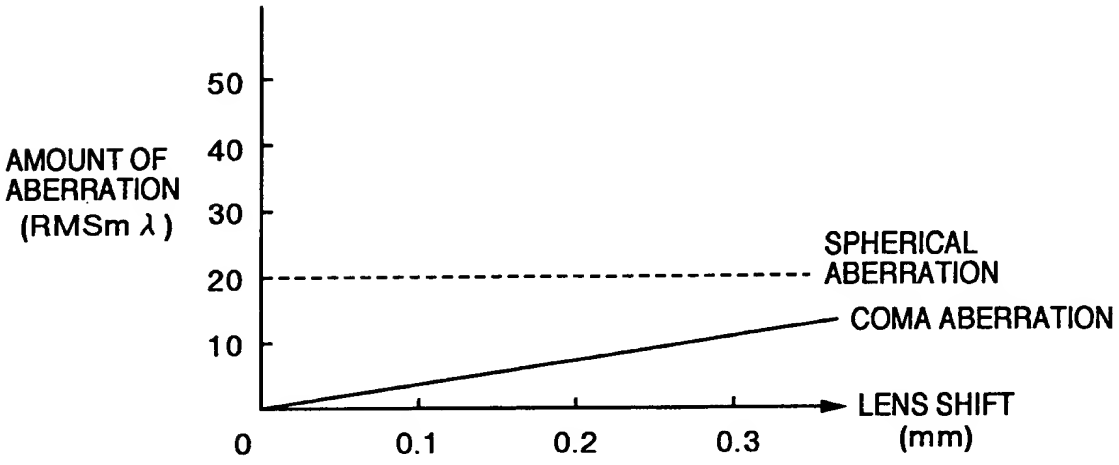

AMOUNT OF
ABERRATION
(RMSm λ)
50
40
30
20
10
SPHERICAL
ABERRATION
COMA ABERRATION
0
0.1
0.2
0.3
LENS SHIFT
(mm)

FIG.7

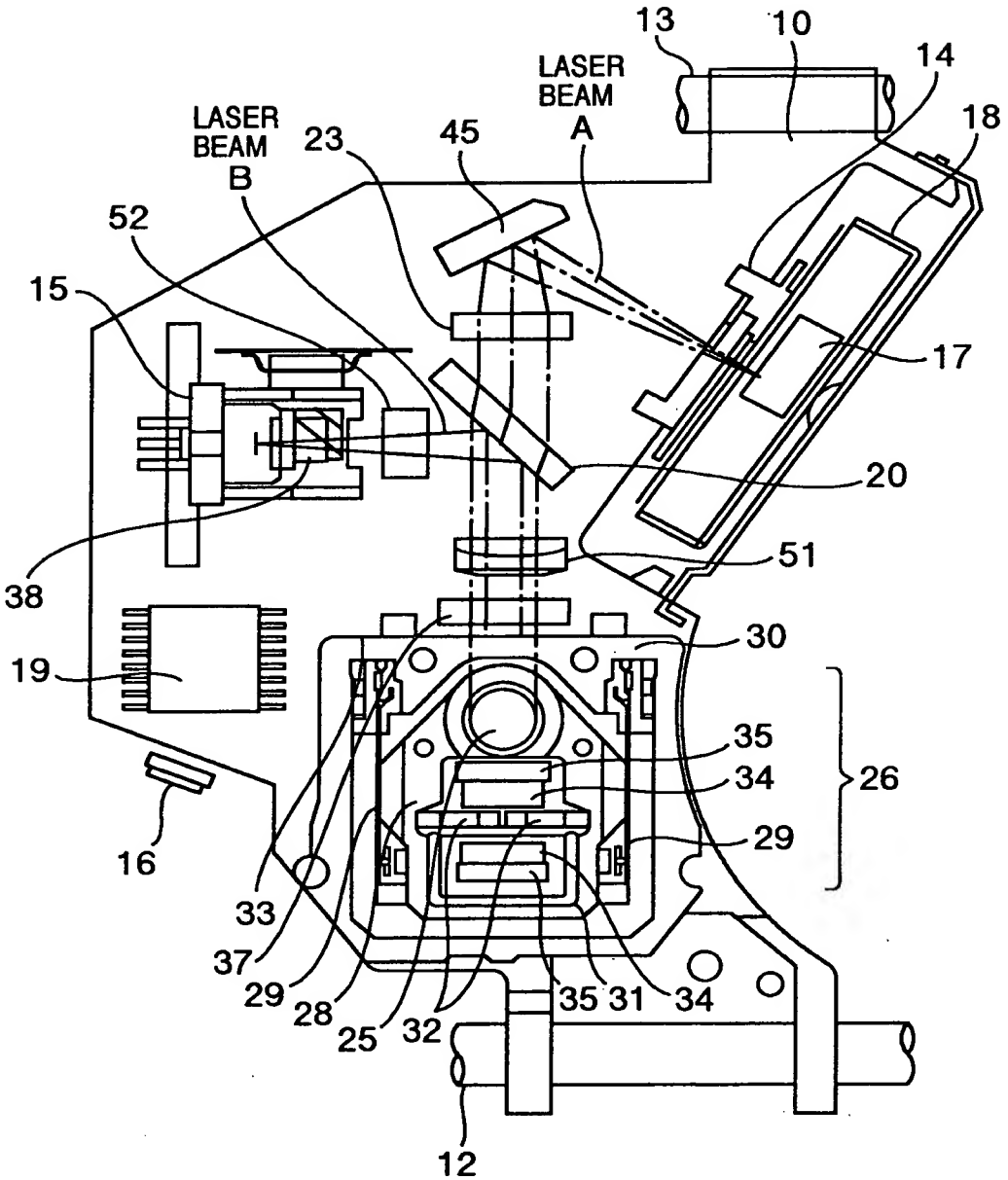

13
10
14
LASER BEAM A
LASER BEAM B
23
45
18
52
15
17
20
51
38
30
19
35
34
26
29
16
33
37
29
28
25
32
35
31
34
12

FIG.8A

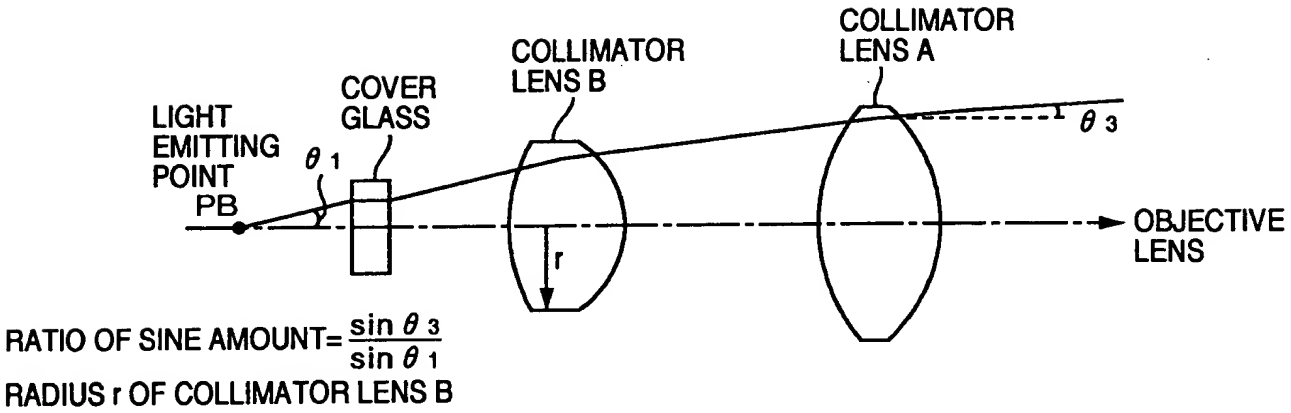


FIG.8B

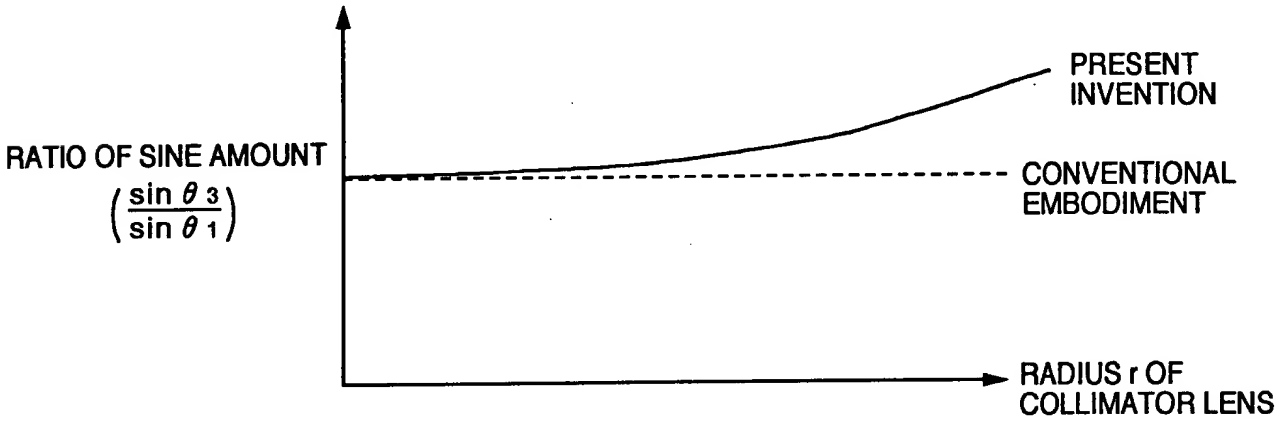
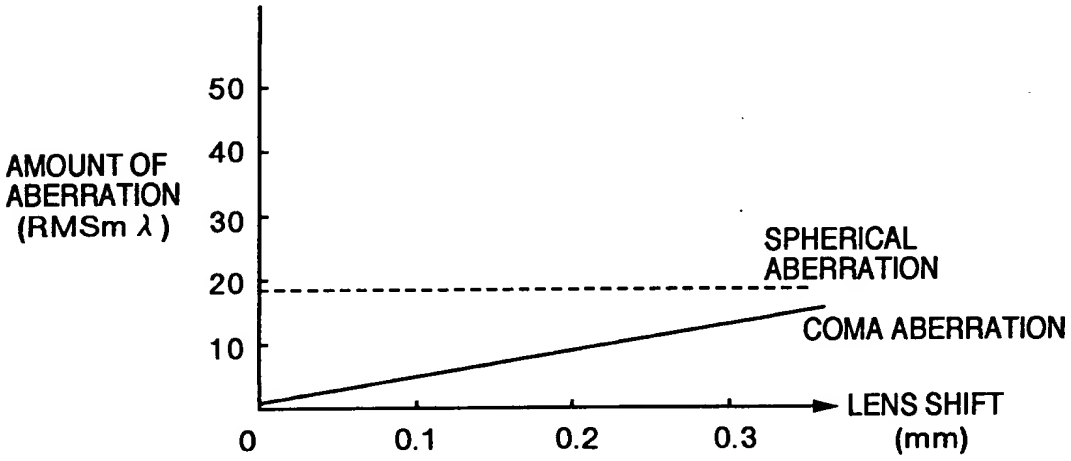



FIG.8C